PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
PATENT EXAMINING OPERATIONS

Art Unit: 2424 (Examiner: Newlin, Timothy R.)

Applicant: Pierce et.al.

Serial No: 10/008,613

Filed: November 8, 2001

Title: SERVICES BASED ON POSITION LOCATION USING BROADCAST DIGITAL TELEVISION SIGNALS

Santa Cruz, California
June 28, 2010

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450 USA

Appeal Brief

Dear Sir:

This Appeal Brief is in response to the final Office Action mailed December 7, 2009, rejecting claims 1 - 59 of the above-referenced application, and the ensuing Advisory Action mailed February 17, 2010. A timely Notice of Appeal was filed May 7, 2010, together with a two-month extension of time and the required fees. Thus, this Appeal Brief is timely. The fee for the Appeal Brief is filed herewith.

Real Party in Interest

The real party in interest is Rosum Corporation, a Delaware corporation having a place of business at 255 San Geronimo Way, Sunnyvale, CA 94085 USA, by virtue of an Assignment recorded on August 13, 2002 at reel/frame 013183/0473.

Related Appeals and Interferences

None.

Status of Claims

Pending: Claims 1 - 59

Rejected: Claims 1 - 59

Status of Amendments

No amendment was filed after the final rejection.

Summary of Claimed Subject Matter

Under the provisions of 37 CFR 41.37(c)(1)(v), the following summary of claimed subject matter is made. The summary is in accordance with the rule because the rule does not require any particular format for this section of the Appeal Brief. Note also that the commentary to the rules provides "[a]ppellant may include any other information of record which will aid the Board in considering the subject matter of each independent claim." 69 FR 49976, Comment 53, third column, August 12, 2004.

The claimed subject matter is summarized with reference to claim 1. The remaining independent claims include similar elements. Claim 1 reads as follows:

Claim 1

A method for providing a physical service to a user of a device, the method comprising:

accessing a location of the device, the location determined from pseudo-ranges between the device and a plurality of digital television (DTV) transmitters, the pseudo-ranges calculated from broadcast DTV signals received by the device from the DTV transmitters, wherein each of the pseudo-ranges represents a difference between a time of transmission from the respective DTV transmitter of a component of the respective DTV signal and a time of reception at the device of the component, as well as a clock offset of the device; and

providing a physical service at the location of the device.

The specification and drawings of this application describe and illustrate several embodiments of the claimed subject matter. See, e.g., specification, paragraphs [0053] - [0112] and Figures 1 - 6. By way of example only, paragraphs [0053] - [0055] of the specification state:

> FIG. 1 depicts a system 100 suitable for implementing the present invention. The system 100 includes a device 102 operated by a user, DTV transmitters 106A-106N, monitor stations 108A-108N, DTV location server 110, and service provider system 120. The DTV transmitters 106 broadcast DTV signals, including to device 102 and to the monitor stations 108. The DTV location server 110 is linked to the user device 102 (via base station 104 in this example) and to the monitor stations 108. The service provider system 120 is linked to the DTV location server 110 and to the user device 102 (also via base station 104 in this example).
>
> FIGS. 2-3 are flow diagrams illustrating methods according to the present invention. Generally speaking, as shown in FIG. 2, the location of device 102 is determined 210 using DTV signals which are received by the user device 102. A service which depends on this location is provided 220.
>
> In the example of FIG. 1, the DTV transmitters 106, monitor stations 108 and DTV location server 110 are involved in determining 210 the location of the device 102. In one implementation (also shown in FIG. 2), the broadcast DTV signals received by device 102 are used to calculate 212 pseudo-ranges between the user device 102 and the DTV transmitters 106. The pseudo-ranges, in turn, are used to determine 214 the location of the device 102. In the implementation shown, the pseudo-ranges are based on the time of flight between the DTV transmitters 106 and the user device 102, as determined by the received DTV signals. The monitor stations 108 track clock skew between the clocks for the DTV transmitters 106. The server 110 calculates the location for user device 102, using the time-of-flight measurements from user device 102 and the clock skew information from the monitor stations 108. The server 110 also accesses weather server 114 in order to make corrections due to weather conditions, and DTV phase center database 112 in order to retrieve the known locations of the DTV transmitters 106. Further details on various implementations are given below in FIGS. 7-34.
>
> Further detail is provided at paragraph [0116] of the specification.
>
> User device 102 determines a pseudo-range between the user device 102 and each DTV transmitter 106 (step 704). Each pseudo-range represents the time difference (or equivalent distance) between a time of transmission from a transmitter 108 of a

component of the DTV broadcast signal and a time of reception at the user device 102 of the component, as well as a clock offset at the user device.

As explained in the example set forth in paragraphs [0053] - [0055] and [0116] of the specification, broadcast DTV signals received by device 102 are used to calculate pseudo-ranges between device 102 and the DTV transmitters 106. The pseudo-ranges, in turn, are used to determine the location of device 102. A service which depends on this location is then provided. Each pseudo-range represents the time difference between a time of transmission from a transmitter 108 of a component of the DTV broadcast signal and a time of reception at user device 102 of the component, as well as a clock offset at user device 102.

Grounds of Rejections to be Reviewed on Appeal

1. The rejection of claims 1 – 59 under 35 U.S.C. § 103 as allegedly being unpatentable over U.S. Patent No. 6,006,097 to Hornfeldt et. al (hereinafter "Hornfeldt") in view of U.S. Patent No. 6,028,537 to Suman et al. (hereinafter "Suman"), and further in view of U.S. Patent Application Publication No. 2002/0021187 to Stenberg (hereinafter "Stenberg"), and further in view of U.S. Patent No. 5,510,801 to Engelbrecht et al. (hereinafter "Engelbrecht").

Argument

1. Rejection of claims 1 – 59 under 35 U.S.C. § 103 as allegedly being unpatentable over Hornfeldt in view of Suman, and further in view of Stenberg, and further in view of Engelbrecht

In order to establish a prima facie case of obviousness under 35 U.S.C. § 103, each and every element of the claimed invention must be disclosed in the combination of art applied. Because at least one element of Applicant's claimed invention is not disclosed in the combination of applied art, Applicant respectfully submits that no prima facie case of obviousness under 35 U.S.C. § 103 has been established.

As an initial matter, none of the applied documents disclose the use of DTV signals for positioning. The Examiner cites Stenberg for disclosing broadcast DTV signals. However,

neither Stenberg, nor any of the other cited documents, discloses the use of DTV signals for positioning.

Furthermore, the applied documents fail to disclose the following element recited in each of Applicant's independent claims:

> wherein each of the pseudo-ranges represents a difference between a time of transmission from the respective DTV transmitter of a component of the respective DTV signal and a time of reception at the device of the component, as well as a clock offset of the device

In particular, each of Applicant's independent claims requires the use of a clock offset of the device for which the location is being determined. To teach this element, the Examiner relies upon Engelbrecht. Engelbrecht appears to disclose a TV Location Determination System for determining locations of mobile units based on signals transmitted by TV stations. The system includes a Reference Receiver that receives signals from the TV stations, and determines the time offset and rate of drift for each station (col. 5, lines 59 – 62). Nowhere does Engelbrecht teach or suggest the use of a clock offset of the mobile unit for which the location is being determined.

In the Response to Arguments (Office Action mailed 12/07/09 at page 2), the Examiner disagrees, noting that Engelbrecht states that the time of arrival of a TV signal at Target Receiver 10 can be measured "relative to a received TV station signal" (Engelbrecht at col. 3, lines 11 – 16). Based on that statement, The Examiner provides the following argument:

> In that case, the target receiver disregards its own internal reference clock 10R and instead adopts the clock (i.e. synchronizing signals) of the reference station as its own. In other words, the clock offset of the mobile device is *defined* as the clock offset between the reference station and another station.
> (Office Action at page 2, emphasis in original)

Applicant respectfully disagrees in part. Applicant agrees that in this case the target receiver disregards its internal clock 10R. In the cited passage, Engelbrecht appears to describe

the measurement technique called "time difference of arrival (TDOA)" where the difference in arrival times of two signals is measured. The principal advantage of TDOA over time-of-arrival (TOA) measurements lies precisely in the fact that the local clock offset is eliminated from the measurement. Because such TDOA measurements do not include the local clock offset, they cannot be characterized as the pseudoranges required by each of Applicant's claims.

Applicant respectfully disagrees with the Examiner's assertion that "the target receiver ... adopts the clock (i.e. synchronizing signals) of the reference station as its own." Here the Examiner appears to imply that Target Receiver 10 can obtain an accurate time reference from a TV signal received at an unknown location. Applicant asserts that, without more information, this is simply not possible. Furthermore, nothing in Engelbrecht supports the Examiner's contention.

Consequently, Applicant respectfully disagrees that the Examiner's assertion that "the clock offset of the mobile device is *defined* as the clock offset between the reference station and another station." As stated above, in such TDOA techniques the clock offset is eliminated from the measurement. To support his assertion, the Examiner relies upon Engelbrecht at col. 2, line 56 – 61. However, the cited passage merely describes measurements made by Reference Receiver 11, which uses the measurements to generate correction data describing the "drift" of the timing of the TV transmitters. In particular, these measurements represent "knowledge of their timing offset and offset change" (col. 2, lines 66 – 67). Note that these offsets refer to the timing at the TV transmitter, not to the local clock 10R of Target Receiver 10. Reference Receiver 11 provides the correction data to Target Receiver 10 to prevent "drift" in the location solution.

Finally, the Examiner provides the following argument (at page 2 of the Office Action):

> Since these offsets are subsequently used to calculate the actual propagation delay, pseudo-ranges do "represent" the clock offset of the mobile device as claimed (in addition to the propagation delay).

Applicant respectfully disagrees. As described above, these offsets (referring to the offsets of local clocks 10R) are not present in the TDOA measurements described by Engelbrecht. Therefore, any calculation based on these measurements cannot employ the offsets.

To support his argument, the Examiner relies upon Engelbrecht at col. 3, lines 44 – 62. However, the cited passage merely describes the processing for a location solution, without any reference to the offset of local clock 10R of Target Receiver 10.

In the Advisory Action (mailed 02/17/10), the Examiner states:

> [S]ince the device can measure a time of arrival "relative to a received TV signal," the local offset still exists and is essentially defined as the TV station offset. In this way, the pseudorange at least "represents" the local offset.

Applicant respectfully disagrees. Here the Examiner appears to equate the local offset (that is, the offset of local clock 10R of Target Receiver 10) with the offset of the TV station transmitting the "received TV station signal." Applicant respectfully submits that Engelbrecht provides no teaching or suggestion that these offsets are the same.

Also in the Advisory Action (mailed 02/17/10), the Examiner further states:

> However, even if Engelbrecht does not use the local offset in a position calculation, the §103 rejection would stand. Hornfeldt teaches that a pseudo range represents a propagation delay, while Engelbrecht teaches that devices (including at least TV stations) have a clock offset that is represented by the pseudo range. Even if the local offset is eliminated, the clock offset of the TV stations is explicitly part of the location solution. E.g., cols. 2-3, II. 61-7. Given that, one of ordinary skill would recognize that the mobile device in Hornfeldt would have a clock offset and it could beneficially be used in the location determination, in order to determine location based on one-way propagation delay as taught in Engelbrecht. In short, while neither reference teaches the pseudo range in its entirety, the (obvious) combination thereof meets the claim as a whole.

Here the Examiner again suggests that the clock offset of a TV station could be used instead of the local clock offset of the device. Again, Applicant notes that each of Applicant's claims requires the use of "a clock offset of the device."

Hornfeldt, Suman and Stenberg do nothing to remedy the defects listed above. Accordingly, Applicant respectfully submits that independent claims 1, 13, 32, 49 and 56 are patentable over the cited art, considered alone or in combination. The above arguments apply to each of the dependent claims as well.

Summary

The applied art fails to disclose the use of a local clock offset in generating pseudoranges based on DTV signals for position determination, as required by each of Applicant's claims.

Respectfully submitted,

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Claims Appendix

1. A method for providing a physical service to a user of a device, the method comprising:

accessing a location of the device, the location determined from pseudo-ranges between the device and a plurality of digital television (DTV) transmitters, the pseudo-ranges calculated from broadcast DTV signals received by the device from the DTV transmitters, wherein each of the pseudo-ranges represents a difference between a time of transmission from the respective DTV transmitter of a component of the respective DTV signal and a time of reception at the device of the component, as well as a clock offset of the device; and

providing a physical service at the location of the device.

2. The method of claim 1 wherein the physical service comprises emergency roadside assistance.

3. The method of claim 1 wherein the physical service comprises an E-911 service.

4. The method of claim 1 wherein the device is located in one of a plurality of geographic domains and a quality of the physical service depends on in which geographic domain the device is located.

5. The method of claim 1 wherein the device is a stationary device.

6. The method of claim 1 wherein providing the physical service comprises:

performing the physical service at the location.

7. The method of claim 1 wherein providing the physical service comprises:

transmitting a key code to the device, the key code authorizing provision of the physical service at the location.

8. The method of claim 1 wherein providing the physical service comprises:

contacting a local service provider of the physical service; and

authorizing the local service provider to provide the physical service at the location.

9. The method of claim 8 wherein the device is located in one of a plurality of geographic domains and the local service provider depends on in which geographic domain the device is located.

10. The method of claim 1 wherein the DTV signals are American Television Standards Committee (ATSC) signals.

11. The method of claim 1 wherein the DTV signals are European Telecommunications Standards Institute Digital Video Broadcasting - Terrestrial (DVB-T) signals.

12. The method of claim 1 wherein the DTV signals are Japanese Integrated Service Digital Broadcasting-Terrestrial (ISDB-T) signals.

13. A method for providing a service based on a location of a device, the method comprising:

accessing a location of the device, the location determined from pseudo-ranges between the device and a plurality of digital television (DTV) transmitters, the pseudo-ranges calculated from broadcast DTV signals received by the device from the DTV transmitters, wherein each of the pseudo-ranges represents a difference between a time of transmission from the respective DTV transmitter of a component of the respective DTV signal and a time of reception at the device of the component, as well as a clock offset of the device; and

providing a service according to the location of the device.

14. The method of claim 13 wherein providing the service comprises:

providing information according to the location of the device.

15. The method of claim 13 wherein the device is located in one of a plurality of geographic domains and the service depends on in which geographic domain the device is located.

16. The method of claim 13 wherein the device is stationary.

17. The method of claim 13 wherein the service is provided to a party other than a user of the device.

18. The method of claim 13 wherein providing the service comprises:

the device providing the service.

19. The method of claim 18 wherein accessing the location of the device comprises:

the device calculating the pseudo-ranges from the broadcast DTV signals; and

the device determining the location based on the pseudo-ranges.

20. The method of claim 18 wherein accessing the location of the device comprises:

the device receiving the location from a DTV location server.

21. The method of claim 13 wherein providing the service comprises:

a service provider system providing the service.

22. The method of claim 21 wherein accessing the location of the device comprises:

the service provider system receiving the location from the device.

23. The method of claim 21 wherein accessing the location of the device comprises:

the service provider system receiving the location from a DTV location server.

24. The method of claim 13 wherein providing the service comprises:

a service provider system determining a key code for the service according to the location of the device, the key code enabling provision of the service; and

the service provider system transmitting the key code to the device.

25. The method of claim 13 wherein providing the service comprises:

contacting a local service provider of the service; and

authorizing the local service provider to provide the service at the location.

26. The method of claim 25 wherein the device is located in one of a plurality of geographic domains and the local service provider depends on in which geographic domain the device is located.

27. The method of claim 13 wherein provision of the service occurs automatically without an explicit request by a user of the device.

28. The method of claim 13 further comprising:

receiving a request for the service; and

providing the service only in response to such a request.

29. The method of claim 13 wherein the DTV signals are American Television Standards Committee (ATSC) signals.

30. The method of claim 13 wherein the DTV signals are European Telecommunications Standards Institute Digital Video Broadcasting - Terrestrial (DVB-T) signals.

31. The method of claim 13 wherein the DTV signals are Japanese Integrated Service Digital Broadcasting-Terrestrial (ISDB-T) signals.

32. An apparatus for providing a service based on a location of a device, the apparatus comprising:

means for accessing a location of the device, the location determined from pseudo-ranges between the device and a plurality of digital television (DTV) transmitters, the pseudo-ranges calculated from broadcast DTV signals received by the device from the DTV transmitters, wherein each of the pseudo-ranges represents a difference between a time of transmission from the respective DTV transmitter of a component of the respective DTV signal and a time of reception at the device of the component, as well as a clock offset of the device; and

means for providing a service according to the location of the device.

33. The apparatus of claim 32 wherein the device is located in one of a plurality of geographic domains and the service depends on in which geographic domain the device is located.

34. The apparatus of claim 32 wherein the device is stationary.

35. The apparatus of claim 32 wherein the service is provided to a party other than a user of the device.

36. The apparatus of claim 32 wherein the means for providing the service is incorporated into the device.

37. The apparatus of claim 36 wherein the means for accessing the location of the device comprises:

means for calculating the pseudo-ranges from the broadcast DTV signals;

means for determining the location based on the pseudo-ranges; and

wherein the means for calculating the pseudo-ranges and the means for determining the location are incorporated into the device.

38. The apparatus of claim 36 wherein means for accessing the location of the device comprises:

means for receiving the location from a DTV location server, said means incorporated into the device.

39. The apparatus of claim 32 wherein the means for providing the service is incorporated into a service provider system.

40. The apparatus of claim 39 wherein the means for accessing the location of the device comprises:

means for receiving the location, said means incorporated into the service provider system.

41. The apparatus of claim 32 wherein the means for providing the service comprises:

means for determining a key code for the service according to the location of the device, the key code enabling provision of the service; and

means for transmitting the key code to the device.

42. The apparatus of claim 32 wherein the means for providing the service comprises:

means for contacting a local service provider of the service; and

means for authorizing the local service provider to provide the service at the location.

43. The apparatus of claim 42 wherein the device is located in one of a plurality of geographic domains and the local service provider depends on in which geographic domain the device is located.

44. The apparatus of claim 32 wherein provision of the service occurs automatically without an explicit request by a user of the device.

45. The apparatus of claim 32 wherein provision of the service occurs only in response to a request for the service.

46. The apparatus of claim 32 wherein the DTV signals are American Television Standards Committee (ATSC) signals.

47. The apparatus of claim 32 wherein the DTV signals are European Telecommunications Standards Institute Digital Video Broadcasting - Terrestrial (DVB-T) signals.

48. The apparatus of claim 32 wherein the DTV signals are Japanese Integrated Service Digital Broadcasting-Terrestrial (ISDB-T) signals.

49. An apparatus for enabling a provision of a physical service to a user of a device, the apparatus comprising:

means for accessing a location of the device, the location determined from pseudo-ranges between the device and a plurality of digital television (DTV) transmitters, the pseudo-ranges calculated from broadcast DTV signals received by the device from the DTV transmitters, wherein each of the pseudo-ranges represents a difference between a time of transmission from the respective DTV transmitter of a component of the respective DTV signal and a time of reception at the device of the component, as well as a clock offset of the device; and

means for enabling provision of a physical service at the location of the device.

50. The apparatus of claim 49 wherein the physical service comprises emergency roadside assistance.

51. The apparatus of claim 49 wherein the physical service comprises an E-911 service.

52. The apparatus of claim 49 wherein the means for enabling provision of the physical service comprises:

means for delivering the physical service to the location.

53. The apparatus of claim 49 wherein the means for enabling provision of the physical service comprises:

means for transmitting a key code to the device, the key code authorizing provision of the physical service at the location.

54. The apparatus of claim 49 wherein the means for enabling provision of the physical service comprises:

means for contacting a local service provider of the physical service; and

means for authorizing the local service provider to provide the physical service at the location.

55. The apparatus of claim 54 wherein the device is located in one of a plurality of geographic domains and the local service provider depends on in which geographic domain the device is located.

56. A system for providing a service based on a location of a device, the system comprising:

a device for receiving broadcast DTV signals from a plurality of DTV transmitters and calculating pseudo-ranges from the received DTV signals, wherein each of the pseudo-ranges

represents a difference between a time of transmission from the respective DTV transmitter of a component of the respective DTV signal and a time of reception at the device of the component, as well as a clock offset of the device;

a DTV location server for determining a location of the device from the pseudo-ranges; and

a service provider system for providing a service according to the location of the device.

57. The system of claim 56 wherein the device serves as the service provider system by providing the service.

58. The system of claim 56 wherein:

the device serves as the DTV location server by determining the location from the pseudo-ranges; and

the device serves as the service provider system by providing the service.

59. The system of claim 56 wherein

the device serves as the DTV location server by determining the location from the pseudo-ranges.

Related Appeals and Interferences Appendix

None.

Evidence Appendix

None.